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MOXA®

ThinkCore DA-661/662/663-CE
User's Manual

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ThinkCore DA-661/662/663-CE User's Manual

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1

Introduction

The mechanism design for this series of embedded computers follows the standard 19-inch 1U rack-mounted form factor. Each model supports 110 to 220 VAC/VDC power inputs, which is suitable for power industry applications, such as substation automation systems, remote power meter measuring systems, and power distribution networking automation systems. The DA-661 features 16 RS-232/422/485 serial ports, dual 10/100 Mbps Ethernet, one PCMCIA for WLAN 802.11b/g wireless communication expansion, and a CompactFlash slot for storage expansion. The DA-662 provides 4 LAN ports, and the DA-663 provides 2 multi-mode 100BaseFX fiber optic connectors as the network communication interface.

Microsoft® Windows® CE 5.0 is an open, scalable, 32-bit OS (operating system) that allows you to build a wide range of innovative, small footprint devices. A typical Windows® CE-based device is designed for a specific use, and often runs disconnected from other computers, or is distributed as a front-end to a centralized host. Examples include enterprise tools, such as industrial controllers, communications hubs, POS (point-of-sale) terminals, and display devices, such as HMIs, advertising appliances, and interactive panels.

The following topics are covered in this chapter:

- **Overview**
  - Model Descriptions and Package Checklist
  - DA-661/662/663 Product Features
  - Hardware Specifications
- **Software Features**
  - Applications and Services Development
  - Networking and Communications Capabilities
  - Supporting Servers and Daemons
- **Obtaining the Firmware Build Versions**
- **Memory and File Systems**
- **Hive-based Registry**
- **Inserting a CompactFlash Card into the Computer**
- **Inserting a USB Mass Storage Device into the Computer**
- **Inserting a PCMCIA Card into the Computer**
- **Using Fiber Ethernet for DA-663-CE**
- **RS-232/422/485 Serial Ports**

Overview

The MOXA ThinkCore DA-66X-CE Series (referred to here as the DA-66X-CE) includes the DA-661-CE, DA-662-CE, and DA-663-CE. These RISC-based ready-to-run embedded computers are ideal for embedded applications. The DA-66X-CE features 16 RS-232/422/485 serial ports, multiple 10/100 Mbps Ethernet ports, a PCMCIA interface for wireless LAN communication, a CompactFlash port for flash disk expansion, and USB ports for adding additional memory (such as a USB Flash disk).

The DA-66X-CE uses an Intel XScale IXP-425 533 MHz RISC CPU. Unlike the X86 CPU, which uses a CISC design, the IXP-425's RISC design architecture and modern semiconductor technology provide the DA-66X-CE with a powerful computing engine and communication functions, but without generating a lot of heat. The built-in 32 MB NOR Flash ROM and 128 MB SDRAM give you enough memory to run your application software directly on the DA-66X. As the dual LAN ports are built right into the IXP-425 CPU, the DA-66X-CE makes an ideal communication platform for network security applications. The DA-662 has four Ethernet ports and the DA-663 has 2 multi-mode fiber optic connectors. If your application requires placing the DA-66X-CE at a site that is not located near an Ethernet LAN connection, you can connect to the network using the DA-66X's PCMCIA port to attach a wireless LAN card.

The DA-66X-CE series of ready-to-run embedded computers are built on the Microsoft® Windows® CE 5.0 operating system (OS). Building on a common, widely used programming environment makes them suitable for both new system development and legacy system migration.

All of the necessary device drivers, such as a PCMCIA Wireless LAN module and Keypad, LCM, and Buzzer control, are included with the DA-66X-CE. The operating system, device drivers, and the software you develop for your own applications, can all be stored in the DA-66X's Flash memory.

Model Descriptions and Package Checklist

The three DA-66X-CE models are described below:

DA-661-CE
RISC-based ready-to-run embedded computer with 16 serial ports, dual Ethernet ports, PCMCIA, CompactFlash, USB, WinCE 5.0

DA-662-CE
RISC-based ready-to-run embedded computer with 16 serial ports, four Ethernet ports, PCMCIA, CompactFlash, USB, WinCE 5.0

DA-663-CE
RISC-based ready-to-run embedded computer with 16 serial ports, dual fiber multi-mode Ethernet ports, PCMCIA, CompactFlash, USB, WinCE 5.0

The DA-66X-CE is shipped with the following items:

- ThinkCore DA-66X-CE
- 19-inch Rack-mount kit
- Quick Installation Guide
- Document & Software CD
- Cross-over Ethernet cable
- CBL-RJ45M9-150: 150 cm, 8-pin RJ45 to male DB9 serial port cable
- CBL-RJ45F9-150: 150 cm, 8-pin RJ45 to female DB9 console port cable
- Power cord
- Warranty Statement

NOTE: *Notify your sales representative if any of the above items are missing or damaged.*

DA-661/662/663 Product Features

- Intel XScale IXP-425 533 MHz processor
- On-board 128 MB RAM, 32 MB flash ROM
- Sixteen RS-232/422/485 serial ports
- Two 10/100 Mbps Ethernet ports (four ports for DA-662-CE)
- Standard 19-inch rack-mount installation, 1U height
- Wide range of power input voltages from 100 to 240V (both AC and DC)
- LCD screen and push buttons for HMI
- Ready-to-run WinCE 5.0 platform
- Robust, fanless design
- PCMCIA and CompactFlash for storage or wireless LAN expansion (supports 802.11b/g)
- Two USB 2.0 hosts

The DA-66X-CE embedded computers each add a PCMCIA slot and a CompactFlash interface for wireless communication and CompactFlash storage expansion. In addition, the DA-66X-CE integrates two USB hosts and an LCM display for mass storage capability. The following comparison table shows more details about the differences in the three models.

Hardware Specifications

		DA-661	DA-662	DA-663
CPU		Intel XScale IXP-425, 533 MHz		
RAM		128 MB		
Flash		32 MB		
LAN		Auto-sensing 10/100M × 2 with built-in 1.5 KV magnetic isolation protection (RJ45 connectors)	Auto-sensing 10/100M × 4 with built-in 1.5 KV magnetic isolation protection (RJ45 connectors)	N/A
Fiber		N/A	N/A	Multi-mode 100BaseFX × 2 (SC connectors)
Serial Ports	**Port**	RS-232/422/485 × 16 (RJ45 connectors)		
	Serial Protection	15 KV ESD for all signals		
	Data Bits	5, 6, 7, 8		
	Stop Bits	1, 1.5, 2		
	Parity	none, even, odd, space, mark		
	Flow Control	RTS/CTS, XON/XOFF, RS-485 ADDC™		
	Speed	50 bps to 921.6 Kbps		
Serial Console		RS-232 × 1 (RJ45 connectors)		
USB 2.0 Hosts		2		
PCMCIA		Cardbus × 1		
Storage Expansion		Compact Flash × 1**		
LCM		2 × 16 Text Mode		
Push Buttons		4		
Real-time Clock		Yes		
Buzzer		Yes		
Reset Button		Reset to Default × 1		
Power Input		100 to 240 VAC/VDC		
Power Consumption		15W		
Dimensions (W × D × H)		400 × 198 × 45 mm (including rack-mount ear) 440 × 198 × 45 mm (without rack-mount ear)		
Operating temperature		-10 to 60°C (14 to 140°F), 5 to 95% RH		
Storage temperature		-20 to 80°C (-4 to 176°F), 5 to 95% RH		
Regulatory Approvals		EMC: CE Class A, FCC Class A Safety: UL, cUL, TUV		
Warranty		5 years		

* USB Client function is reserved for future enhancement

** CompactFlash is designed for Flash memory card or Microdrive

Software Features

The DA-66X-CE embedded computer is a ready-to-run, RISC-based, "headless" computer with a robust and network-centric design. It features Microsoft® Windows® CE 5.0 as the operating system (OS). Developers of embedded communication applications will find that the open programming environment makes the DA-66X-CE well-suited for both new system development and legacy system migration.

Applications and Services Development

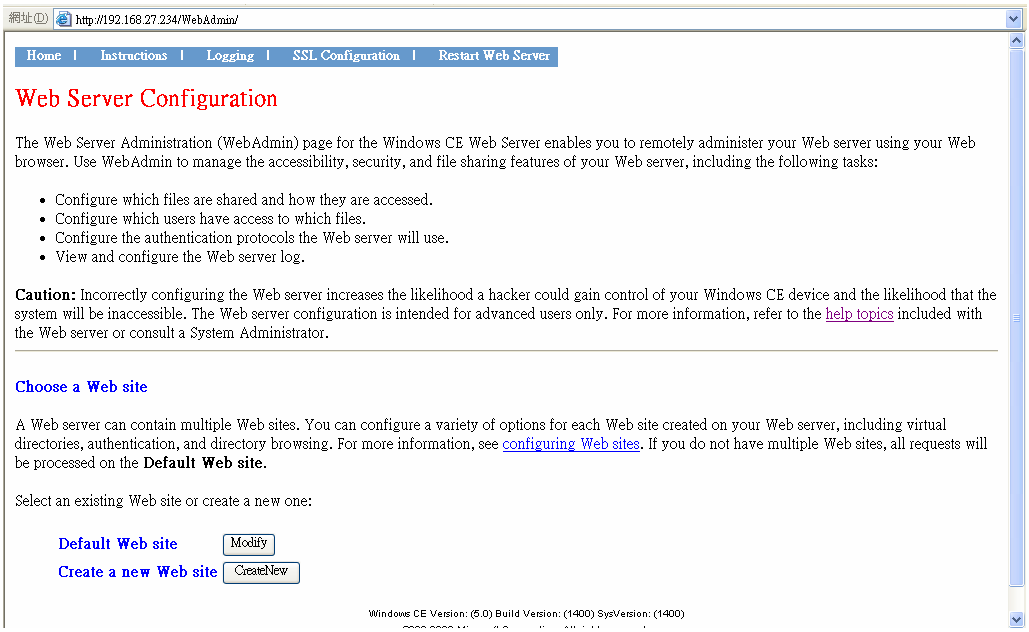
- **C Libraries and Run-times**—Compared to the C libraries and run-times used on a desktop PC running Windows®, the C libraries and run-times on a DA-661/662/663 WinCE are a subset of the WIN32 APIs. The system supports a full ANSI C run-time, standard input/output library, standard input/output ASCII library, and standard ASCII string functions. In addition, compiler C++ exception handling and Run-Time Type Information (RTTI) equivalent to desktop C++ compilers are supported.
- **Component Services (COM and DCOM)**—The Common Object Model (COM) is an operating system-independent, object-oriented system for creating binary software components that can interact with other COM-based components in the same process space, in other processes, or on remote machines.
- **Microsoft® Foundation Classes (MFC)**—MFC is a comprehensive class library and complete object-oriented application framework designed to help build applications, COM components, and controls.
- **SOAP Toolkit**—SOAP is an XML-based protocol for object exchange and calling remote procedures. Microsoft® Windows® CE 5.0 provides functionality similar to the SOAP Toolkit version 2 on the desktop. It provides a layer that allows COM objects to use SOAP as the transport protocol for remote procedure calls and to interact with Web services.
- **Microsoft® .NET Compact Framework 2.0 with Service Pack 1**—Offers a choice of languages, initially Microsoft® Visual Basic® and Microsoft® Visual C#, and eliminates the common problems faced with language interoperability.
- **XML**—Provides the Document Object Model (DOM) for base XML functionality, support for XML Query Language (XQL) and XPATH, Extensible Style Sheet Language Transformations (XSLT) that enable you to transform one class of XML document to another, SAX2 support for event-based parsing of XML documents (including MSXML Writer), and parsing based on Simple API for XML (SAX) for resource-constrained target devices.
- **Winsock 2.2**—Provides enhanced capabilities over Winsock 1.1, including installable service providers for additional third-party protocols, and Media sense.

Networking and Communications Capabilities

- **Simple Network Management Protocol (SNMP)**—Monitors remote connections to the network.
- **Simple Network Time Protocol (SNTP) Client**—Provides support for synchronizing the device's system time with an SNTP server, and supports Daylight Savings Time.
- **Serial Communications**—In addition to the 16550 UART driver bound to a debug port and the console port, a special driver for 8 or 16 additional MOXA home-made serial ports is also included.
- **Network Utilities (IpConfig, Ping, Route)**—Utilities for troubleshooting various network problems.
- **TCP/IP**—Includes IP, Address Resolution (ARP), Internet Control Message (ICMP), Internet Group Membership (IGMP), Transmission Control (TCP), User Datagram (UDP), name resolution and registration, and DHCP.

Supported Servers and Daemons

- **Telnet Server**—A sample server that allows remote administration through a standard Telnet client.
- **FTP Server**—A sample server used for transferring files to and from remote computer systems over a network using TCP/IP.
- **Web Server (HTTPD)**—Includes ASP, ISAPI Secure Socket Layer support, SSL 2, SSL 3, Transport Layer Security (TLS/SSL 3.1) public key-based protocols, and Web Administration ISAPI Extensions.


網址(D) http://192.168.27.234/WebAdmin/
Home | Instructions | Logging | SSL Configuration | Restart Web Server
Web Server Configuration
The Web Server Administration (WebAdmin) page for the Windows CE Web Server enables you to remotely administer your Web server using your Web browser. Use WebAdmin to manage the accessibility, security, and file sharing features of your Web server, including the following tasks:
Configure which files are shared and how they are accessed.
Configure which users have access to which files.
Configure the authentication protocols the Web server will use.
View and configure the Web server log.
Caution: Incorrectly configuring the Web server increases the likelihood a hacker could gain control of your Windows CE device and the likelihood that the system will be inaccessible. The Web server configuration is intended for advanced users only. For more information, refer to the help topics included with the Web server or consult a System Administrator.
Choose a Web site
A Web server can contain multiple Web sites. You can configure a variety of options for each Web site created on your Web server, including virtual directories, authentication, and directory browsing. For more information, see configuring Web sites. If you do not have multiple Web sites, all requests will be processed on the Default Web site.
Select an existing Web site or create a new one:
Default Web site
Modify
Create a new Web site
CreateNew
Windows CE Version: (5.0) Build Version: (1400) SysVersion: (1400)

Obtaining the Firmware Build Version

There are three ways to obtain the firmware versions of the DA-66X-CE embedded computers. This information is particularly important for identifying features.

- Examine the welcome message after you log on to the computer.
- Log on to the web-based management system (described in a later chapter) to view the system information.

Memory and File Systems

The 128 MB of SDRAM space is divided into two main parts. The main memory, which houses the operating system and user applications runs, has a capacity of about 112 MB. The kernel image occupies the remainder of the memory space.

The internal file system in the DA-661/663/663-CE embedded computer controls access to the ROM, and also provides file storage in the object store, which is in the RAM. The ROM file system provides persistent storage for applications and their related data even when the main power supply is lost. It integrates the read-only files that are stored in the Flash ROM with the read/write files of both an application and a user. A child directory named "NORFlash" under the root indicates available ROM storage of the flash memory of size about 15.5 MB.

The root directory is a RAM file system of size 15.5 MB. It can be used for storing temporary files for your applications and data. However, do not place persistent files or applications in the root directory, because they will be deleted when the system is shut down. Instead, place them in the "NORFlash" directory.

The internal file system supports TFAT (Transaction-safe File Allocation Table) which is a safer mechanism than FAT. TFAT prevents the file system from write corruption when the power shuts down unexpectedly. When power shuts down, the file state is rolled back. In addition, TFAT is a superset of FAT. This means that the internal file system of the computer provides the ability to mount the external FAT file systems.

Hive-based Registry

The registry for the DA-66X-CE is a hive-based registry instead of a RAM-based registry. The hive-based registry stores registry data inside files, or hives, which can be kept on any file system. This eliminates the need for performing backup and restoring power.

Each file or hive contains a collection of registry data. The hive-based registry is split into two hives: the system hive, which contains all system data, and the user hive, which contains all data pertinent to one particular user. The DA-66X-CE embedded computer is a multi-user system and accordingly contains several user hives. A user's hive will be mounted on logon and dismounted on logoff.

Inserting a CompactFlash Card into the Computer

The DA-66X-CE is equipped with a CompactFlash slot of type II that supports cards of both types I and II. A mass storage card is considered to be a standard attachment to the computer. When an empty mass storage card is inserted into the slot, the computer automatically formats it to the FAT system. This process takes a few minutes to complete. When a mass storage card is inserted, a directory named "CFFloder" is created under the root directory, and the newly created directory serves a link to the storage.

The following table lists CF storage devices that have been tested successfully for compatibility.

Vendor	Size	Speed
PRETEC	128 MB	
SanDisk Ultra II	1 GB	
Transcend	2 GB	45X
Transcend	2 GB	80X
Transcend	4 GB	80X

ATTENTION

In some circumstances, you may find that your CF card is not detected when the system reboots. If this happens do the following:
(a) Unplug the CF card and then plug the card back in again.
(b) Power down the system and then power it back up again.

Inserting a USB Mass Storage Device into the Computer

The USB mass storage device is considered to be highly portable between your PC and a computer that does not support the TFAT system. We suggest that you format your devices with the FAT format. When the first USB storage device is plugged into the slot on the back of the computer, a directory named "USBDisk" under the root directory is created on the internal file system as a link to the storage device. The directory created for the second USB device is "USBDisk2."

The following table lists USB mass storages devices that have been tested successfully for compatibility.

Vendor	Device Name	Size
CRUZER	mini	128 MB
Intel	Flash memory	128 MB
Abocom		128 MB
PQI		256 MB
Transcend	JetFlash	512 MB
Transcend	JetFlash	1 GB

ATTENTION

Some USB storage devices may not be detected by the system. We suggest that you use one of the devices listed in the above table, since these USB mass storage devices have been tested successfully for compatibility.

Inserting a PCMCIA Card into the Computer

The DA-66X-CE computer does not have a built-in embedded wireless card. If you get a PCMCIA wireless card, be sure that it has a WinCE5.0 driver. The following list shows the supported PCMCIA Net Cards that we tested. Most of the RTL8139 PCI PCMCIA cards and NE2000 PCI PCMCIA cards work with the DA-66X-CE.

Vendor	Device Name	Speed
D-Link	DFE-690TXD PCMCIA Ethernet Card	10/100M

Using Fiber Ethernet for the DA-663-CE

The DA-663-CE provides 2 multi-mode 100BaseFX fiber optic connectors as the network communication interface. The fiber connectors support distances of up to 2 km between links with an optical output of –20 dBm, an extinction ratio of10 dB, and a total receiver input of –32 dBm.

RS-232/422/485 Serial Ports

The DA-66X-CE embedded computer comes with two embedded serial ports, referred to as COM1 and COM2. COM1 is hidden inside the casing and is used for debugging purposes when developing firmware. COM2 is used as the console port, which allows you to connect to the computer over a serial connection. Although the console port can be used for applications such as data acquisition and control, we suggest using the sixteen serial ports located on the back of the device for applications.

From left to right, the sixteen serial ports are designated as "COM3" through "COM18". The serial ports are designed for reliability and high-speed operation, up to 921600 bps. Each port incorporates three selectable operation modes (i.e., RS-232, RS-422, and RS-485) in order to handle diverse applications. For detailed information on the serial port configuration, please refer to Serial Port Configuration in Chapter 3, Web-based Management System.

2

Getting Started

In this chapter, we explain how to use a PC to operate a DA-66X-CE computer. For clarity, the PC that you will be using to connect to the DA-66X-CE is referred to as a development workstation, and the DA-66X-CE computer is called a target computer.

In addition, manual steps are described to facilitate operations such as system time adjustment, troubleshooting network connectivity, etc. Some of these operations can be done using system commands after gaining access to the computer, and others can be done using a web-based management system, which is described in a later chapter.

The following topics are covered in this chapter:

- **Starting Your DA-661/662/663 Computer**
- **Resetting Your DA-661/662/663 Computer**
- **Operating Your DA-661/662/663 Computer via the Serial Console**
- **Changing the Network Settings**
- **Operating Your DA-661/662/663 Computer by Telnet Client**
- **User/Group Management**
- **Adjusting System Time and RTC Time**
- **Starting and Stopping Services**
- **Troubleshooting Network Connectivity**
- **Simple Network Management Protocol (SNMP)**

Starting Your DA-661/662/663 Computer

Connect the SG wire to the shielded contact located in the upper left corner of the DA-66X-CE computer, and then power it on by connecting it to the power adaptor. It takes about 30 to 60 seconds for the system to boot up. Once the system is ready, the "Ready" LED will light up. The light will stay lit until you shut down the computer.

Resetting Your DA-661/662/663 Computer

Cold-Start: You seldom need to perform a cold-start on a DA-66X-CE computer. In some cases, such as when the computer stops responding, an application locks up, or you upgrade the firmware, it may be necessary to perform a cold-start. Unplug the power line and then plug it back in again. The computer will reboot itself immediately.

Resetting to Factory Defaults: If the computer is not working properly and you want to reset it back to the factory default settings, press and hold the "Reset to Default" button for at least 5 seconds. The buzzer will sound while the factory default settings are being loaded. After the factory defaults have been loaded, the computer reboots itself. Do not confuse this with the "Reset" button. In some situations when you cannot boot the computer at all, power on the computer and hold the "Reset to Default" button for at least 20 seconds.

Operating Your DA-661/662/663 Computer via Serial Console

The serial console port (located next to the two LAN ports) gives users a convenient way of connecting the development workstation to the console utility of the target computer. This method is particularly useful when using the computer for the first time.

After you have wired a serial cable, go back to the development workstation and start a terminal program (e.g., HyperTerminal) by using the settings shown below for the serial console port.

Baudrate	115200 bps
Parity	None
Data bits	8
Stop bits	1
Flow Control	None
Terminal	ANSI

After a successful connection, type the login name and password as requested to log on to the computer. The default values are both **admin**.

Login: admin

Password: admin

Changing the Network Settings

The DA-66X-CE computer comes with two or four network interfaces. The default IP addresses and netmasks of the network interfaces are as follows:

	Default IP Address	**Netmask**
LAN1	192.168.3.127	255.255.255.0
LAN2	192.168.4.127	255.255.255.0
LAN3	192.168.5.127	255.255.255.0 (DA-662 only)
LAN4	192.168.6.127	255.255.255.0 (DA-662 only)

For most applications, you will need to change the network settings to fit whatever local network development workstation is connected to. If you do not change the IP addresses, you may not be able to make a network connection to the DA-66X-CE directly. The "netconfig" command is a utility that is used to complete the task. Before changing the IP addresses, type "netconfig -h" to list the help for this command.

DA-661-CE / DA-663-CE

\> **netconfig -h**
Usage: netconfig –n <"LAN1" or "LAN2"> [-EnableDHCP] [-i <IP address>] [-m <netmask>] [-d <DNS server>] [-g <gateway>] [-w <WINS Server>]

DA-662-CE

\> **netconfig -h**
Usage: netconfig –n <"LAN1" or "LAN2" or "LAN3" or "LAN4"> [-EnableDHCP] [-i <IP address>] [-m <netmask>] [-d <DNS server>] [-g <gateway>] [-w <WINS Server>]

For example, if your development workstation has a LAN port at 192.168.1.1, and the IP address of the Domain Name Server (DNS) is 192.168.2.6, execute the following command.

\> **netconfig –n LAN1 –i 192.168.1.5 –m 255.255.255.0 –g 192.168.1.254 –d 192.168.2.6**

Use the command "netconfig" to view the updated settings.

> netconfig
LAN1 Interface Configuration:
IP Address: 192.168.1.5
SubNet Mask: 255.255.255.0
Gateway: 192.168.1.254
DNS: 192.168.2.6

LAN2 Interface Configuration:
IP Address: 192.168.4.127
SubNet Mask: 255.255.255.0
Gateway:
DNS:

Operating Your DA-661/662/663 Computer via Telnet Client

We suggest changing the network settings of the computer (see the above section) so that at least one of the two network ports is on the same LAN as your development workstation.

Use a cross-over Ethernet cable to connect directly from your development workstation to the DA-66X-CE computer, or use a straight-through Ethernet cable to connect the computer to a LAN hub or switch. Next, use the Telnet client in your development workstation to connect to the Telnet console utility of the DA-66X-CE computer. After connecting successfully, type the login name and password as requested to log on to the computer.

Login: admin

Password: admin

After logging on via the console port or a Telnet client, a list of busybox commands are available to operate the computer. Use "HELP" to display all of the commands and type "HELP [command name]" to display extended help for the given command. Some of these commands, such as

"DATE" and "TIME" are very useful for you to manage the system time of the computer. Other commands, such as "DIR" and "MKDIR" are good utilities for file management. For example, to inspect the file structure of the root directory, type **DIR**.

```
> dir /b
Network
NORFlash
My Documents
Program Files
Temp
Windows
```

User/Group Management

User Grouping: You often need to define a user group to associate with a particular system service and manage this service to be accessible only by the users authorized to register with this group. Three user groups, namely **ftpd**, **telnetd**, and **httpd**, have been created in the default factory kernel for your convenience.

Use command "*useradd –g <groupName>*" to create a user group.

```
\> useradd –g yyyy
group yyyy has been added.
```

To remove a group, use the command "*userdel –g <groupName>*".

```
\> userdel –g yyyy
group yyyy has been removed.
```

User Addition: Use the command "*useradd <newUserID>*" to add a user for accessing the system. The user's password is defaulted to the same as the user name.

```
\> useradd xxxx
user xxxx has been added.
```

In addition, you can manage this user to access a particular service by typing "-g" followed by the user group name of the service, i.e., "*useradd –g <groupName> <newUserID>*". For example,

```
\> useradd –g telnetd xxxx
user xxxx is existent
group telnetd is existent
user xxxx has been added to group yyyy
```

User Deletion: Use command "*userde <userID>l*" to delete a user for accessing the system. User "admin" cannot be deleted.

```
\> userdel xxxx
user xxxx has been deleted
```

You can also just remove a user from a user group with the command "*userdel –g <groupName> <newUserID>*". For example,

\> **userdel –g yyyy xxxx**
user xxxx has been removed from group yyyy

Password Change: Use the command "*passwd <userID>*" to change your login password. Type

\> **passwd xxxx**
Current password:
New password:
Retype new password:
Password has been changed

User List: Use command "*userlist*" to list all users.
\> **userlist**
List all users

Adjusting System Time and RTC Time

The DA-66X-CE computer has two time settings: the system time (or CPU clock) and the RTC (Real-time Clock) time. The system time regulates the execution of instructions and the RTC keeps track of the time even when the computer is turned off. RTC time runs on a special battery that is not connected to the normal power supply. Do not confuse a computer's real-time clock with its CPU clock.

Setting the System Time Manually: Use the ***date***, and ***time*** commands to query the current system date/time or to set a new system date/time.

```
\> date
The current date is: Tuesday, November 22, 2005
Enter the new date (mm-dd-[yy]yy): 12-23-05

\> date /T
Wednesday, November 23, 2005

\> time
The current time is: 5:27:17 PM
Enter the new time (hh:mm:ss): 16:02:00

\> time /T
4:02:04 PM
```

Adjusting RTC Time: Use the command ***hwclock -w*** to convert the system time to the RTC time.

```
\> hwclock -w
```

Use the command ***hwclock –w YYYY-MM-DD hh:mm:ss*** to update the RTC time manually.

```
\> hwclock –w 2005-12-23 15:00:00
```

Use the command ***hwclock*** to query the updated RTC time.

```
\> hwclock
2005-12-23 15:00:00
```

Starting and Stopping Services

After booting up, the DA-66X-CE computer runs several services continuously to serve requests from users or other programs. Notable services include telnet ("TEL0:"), console ("CON0:"),

world wide web HTTP ("HTP0:"), and file transfer FTP ("FTP0:"). You seldom need to use these services. However, you can still start up or stop a service with its associated name by using the command **services**. For example,

Start the FTP service with

```
\> services start FTP0:
```

Stop the FTP service with

```
\> services stop FTP0:
```

Troubleshooting Network Connectivity

The **ipconfig** tool prints the TCP/IP-related configuration data of a host including the IP addresses, gateway, and DNS servers.

```
\> ipconfig /all
Windows IP configuration
Ethernet adapter Local Area Connection:
IP Address: 192.168.4.127
Subnet Mask: 255.255.255.0
Adapter Name: IXP425ETHNPE2
Description: IXP425ETHNPE2
Adapter Index: 2
Address: 80 86 33 33 34 12
DHCP Enabled: NO
Ethernet adapter Local Area Connection:
IP Address: 192.168.14.202
Subnet Mask: 255.255.248.0
Default Gateway: 192.168.15.254
Adapter Name: IXP425ETHNPE1
Description: IXP425ETHNPE1
Adapter Index: 3
Address: 78 56 34 91 cc dd
DHCP Enabled: NO

Host name: WindowsCE
Domain Name:
DNS Servers: 192.168.1.6
NODETYPE: 8
Routing Enabled: NO
Proxy Enabled: NO
```

To troubleshoot network connectivity or name resolution, use the **ping** command. This command verifies IP-level connectivity to another TCP/IP computer by sending Internet Control Message Protocol (ICMP) Echo Request messages. The corresponding return Echo Reply messages are displayed, along with round-trip times. For more information, type **ping** without parameters.

```
\> ping www.moxa.com
Pinging Host www.moxa.com [192.168.1.16]
Reply from 192.168.1.16: Echo size=32 time<1ms TTL=126
Reply from 192.168.1.16: Echo size=32 time<1ms TTL=126
Reply from 192.168.1.16: Echo size=32 time<1ms TTL=126
```

The **route** utility allows you to view or modify network routing tables. Type this command without parameters to view a list of functions.

```
\> route
```

To view current routing items in the tables,

```
\> route PRINT
```

To add a routing item on network interface 1,

```
\> route ADD 192.168.0.0 MASK 255.255.0.0 192.168.15.254 IF 2
```

To delete a routing item,

```
\> route DELETE 192.168.0.0
```

Simple Network Management Protocol (SNMP)

SNMP is the Internet standard protocol for network management, and belongs to the TCP/IP protocol suite. SNMP was developed to monitor and manage networks. It uses a distributed architecture that consists of agents and managers:

- The SNMP agent is an SNMP application that monitors network traffic and responds to queries from SNMP manager applications. The agent also notifies the manager when significant events occur, by sending a trap.
- An SNMP manager is an SNMP application that generates queries to SNMP-agent applications and receives traps from SNMP-agent applications.

The DA-66X-CE computer installs an SNMP agent to serve as an SNMP device. You should install the SNMP manager on the workstation computer (for example, a Linux system) that monitors the network. After installing the nodes, you need to configure the SNMP manager and agent.

To check SNMP agent capabilities on a target DA-66X-CE computer (e.g., network IP at 192.168.3.127), log on to the workstation computer on which the SNMP manager resides, and type:

\> **snmpwalk -v 2c -c public 192.168.3.127 system**

SNMPv2-MIB::sysDescr.0 Microsoft Windows CE Version 5.0 (Build 1400)

SNMPv2-MIB::sysObjectID.0 SNMPv2-SMI::enterprises.311.1.1.3.3

SNMPv2-MIB::sysUpTime.0 1282929

SNMPv2-MIB::sysContact.0 Your System Contact Here

SNMPv2-MIB::sysName.0 WindowsCE

…

You will see a series of messages from the SNMP agent on the DA-66X-CE computer. You may then proceed to monitor and manage the computer.

3

Web-based Management System

Note: Internet Explorer 5.5 or above is required to use the web-based management system.

The DA-66X-CE ready-to-run embedded computers are network-centric platforms designed to be used as front-end computers for data acquisition and industrial control. Due to the distributed characteristics of the devices that these computers control, they often reside in harsh environments away from the system administrator. To manage these computers, operations such as networking/server configuration, file management, and process (thread) monitoring/control become a critical area to consider.

A web-based management system is installed on the DA-66X-CE computer. The system incorporates often-used features in the CGI, and uses a menu bar.

Before operating the system, set up a network connection from your PC to the target computer, and verify that you can open an Internet browser from your PC after the connection is established. Then, use the IP address of the target computer as a home page URL. After the main screen is displayed, click **Web-Based Management**.

Input your authentication data, including user ID and password, in the corresponding fields (both the ID and password are case sensitive) and then press Enter to request access to the management system.

The default User ID and Password are:

User ID: admin

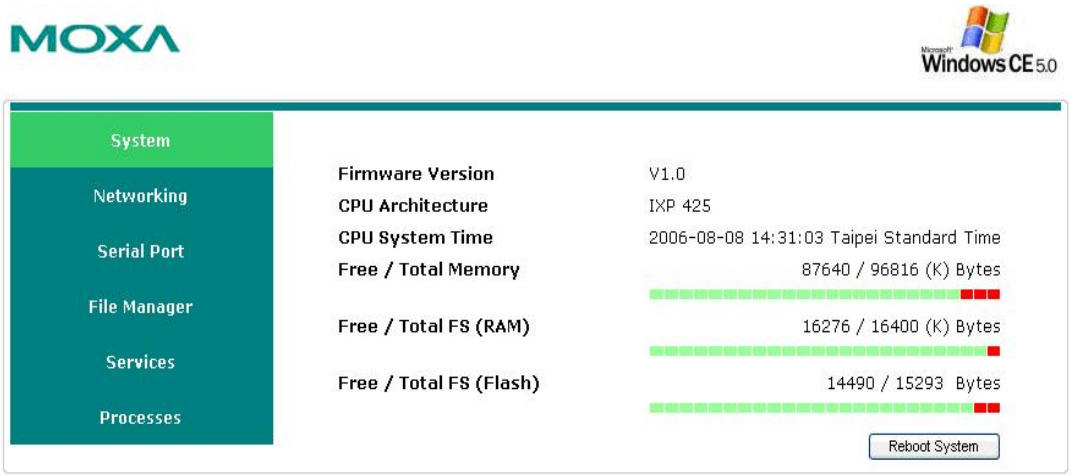
Password: admin

The following topics are covered in this chapter:

- **System Information**
- **Netowrking/Server Configuration**
- **Serial Port Configuration**
- **Process (Thread) Monitoring/Control**
- **Launching Processes Automatically**
- **Services Monitoring/Control**
- **Binary/Text File Management**

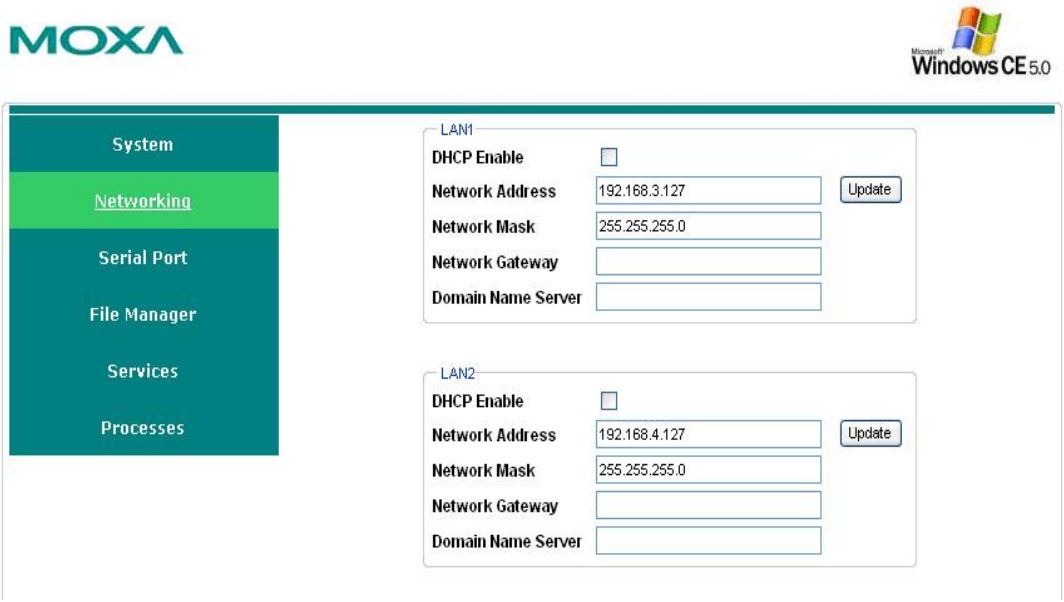
System Information

After you log on successfully, the main page displays the system information of the target computer, including the firmware version of the computer, the CPU system time, and system resources, including main memory and file system usage (RAM and Flash).



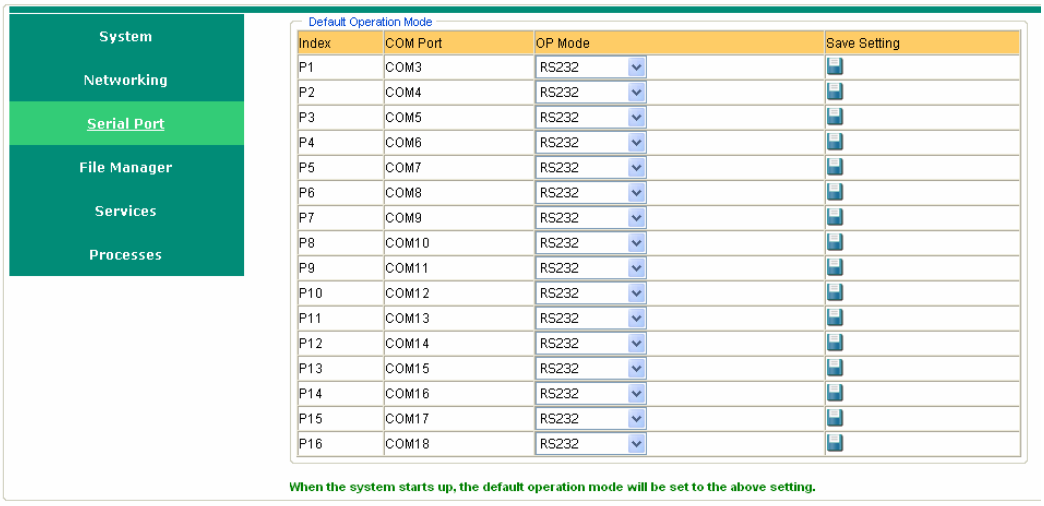
Networking/Server Configuration

The target computer has two network interfaces. To view or change the settings, click the ***Networking*** item on the menu bar. After the page loads, enter the relevant details on the corresponding text fields and then click **Update** to make the changes effective for the interfaces.



Serial Port Configuration

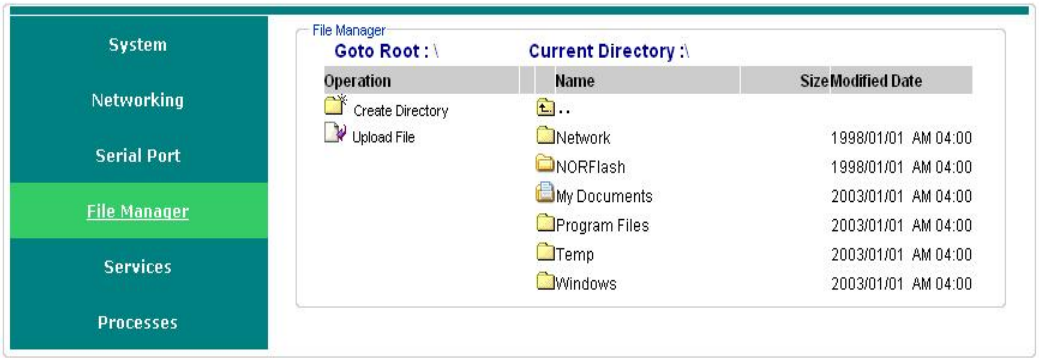
The target computer consists of multiple high-performance serial ports, each with 3-in-1 (RS-232, RS-422, or RS-485) operation mode switch capability, with the default set to RS-232. You can specify each of these ports to operate at a specific mode. The updated settings take effect after the system is rebooted and remain in force until another update is made.



Binary/Text File Management

On a PC, it is certainly convenient to have a friendly window-based file manager to browse, delete, and organize files and directories. On the target computer, such a convenient feature is simulated by the web-based management system. Click **File Manager** to view the directory tree of your target computer. Using the file manager, you can perform the following operations:

- To browse a child directory, click the name of the directory.
- To delete a file, click the ***X*** in front of the file icon.
- To create a child directory, click ***Create Directory*** and then follow the instructions.
- To refresh the current directory, click ***Current Directory*** at the top of the page.



In addition, the management system offers a mechanism for file upload. This mechanism helps you

transfer files from your workstation to the target computer in an easy way. For instance, after you have built an application on the development workstation, you can use this mechanism to upload the application to the current directory of the target computer.

Step 1: Click **Upload File**. A browser window pops up.

Step 2: From the pop-up browser window, click **Browse** to bring up a local file manager.

Step 3: Browse to and select the file that you want to upload and click **Open**.

Step 4: Navigate back to the browser window, and click **OK**. The system starts to upload the file.

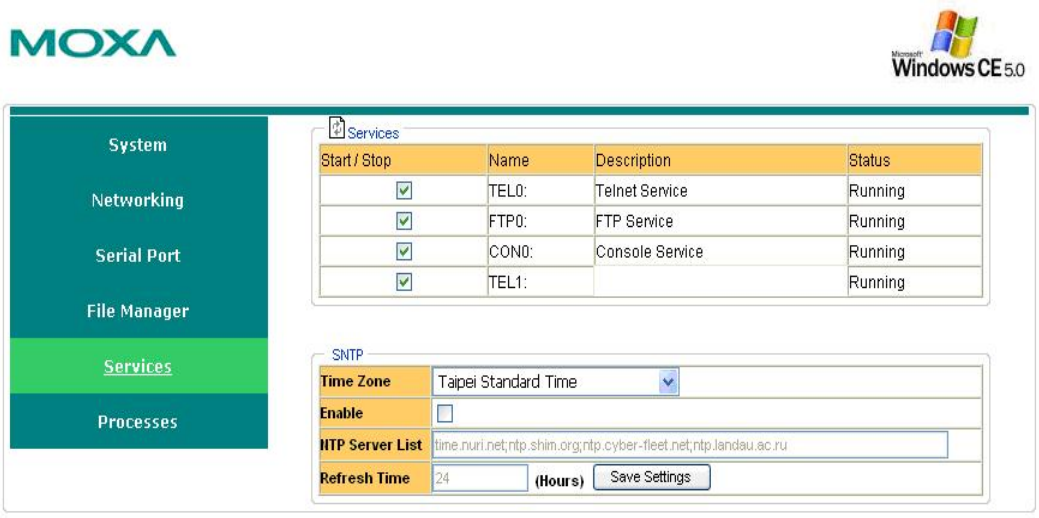
Step 5: After the file is uploaded completely, refresh the page.

Services Monitoring/Control

Some services run in the background to provide services, such as ftp, and telnet daemons, for user requests. To monitor and control these services, do the following:

Step 1: Click the **Services** item on the main menu bar. The running services are displayed.

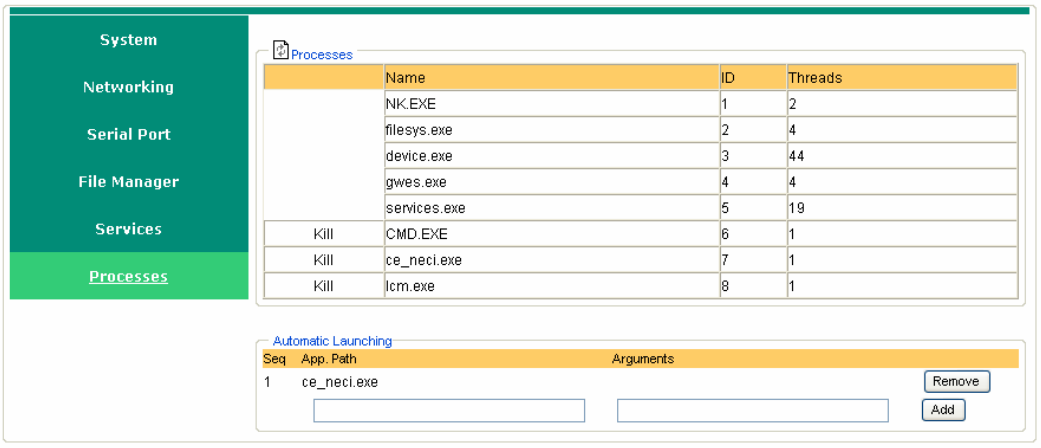
Step 2: Click the relevant check box to toggle a start/stop operation for the desired service.



Some listed services cannot be stopped in order to maintain normal operation of the computer. Such services do not have a check box next to them.

Process (Thread) Monitoring/Control

At runtime, the target computer manages up to 32 applications that you can monitor and control via the management system. To view current processes, click the ***Processes*** item on the main menu bar. You can kill a process by clicking the **kill** button next to the process name.



Launching Processes Automatically

To set up your application to start on boot up, do the following:

Step 1: Click the ***Processes*** item on the main menu bar. In the lower part of the page, there is an area marked **Automatic Launching**.

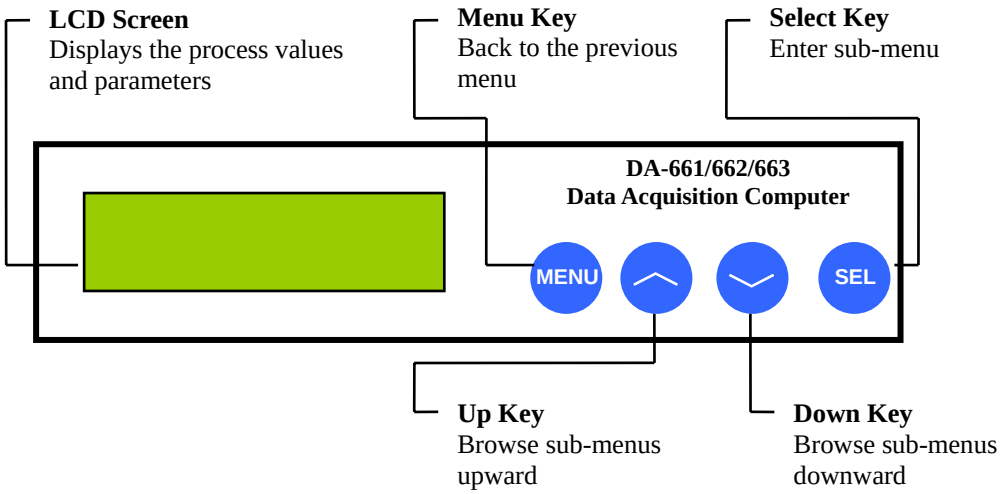
Step 2: Fill in the full path of the application in the first text field and its arguments in a separate text field if there are any.

Step 3: Click **Add**.

A

Using the LCM Keypad

The DA-66X-CE embedded computers implement a set of LCD functions to provide users with on-site parameter readings of the current state of the computer. The LCD screen is operated using the four push buttons. The parameters include the model name, firmware version, network settings, in addition to other parameters.



A typical example:

- **Model Name and Firmware Version—**Screen that appears when the system boots up.

  DA-661/662/663-CE
  Ver 1.0

  Press **MENU** to enter the main menu.

- **Main Menu**

  Network ↑
  Serial Port ↓

  Press ﹀ or use **SEL** to select an item.

  Serial Port ↑
  Console Port ↓

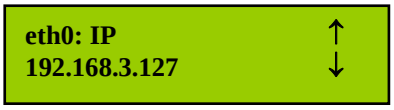
  Press ﹀ or use **SEL** to select an item.

Press ^ or use **SEL** to select an item.

- **Network Settings (Port eth0 for example)**

Press **SEL**.

Press **SEL**.



Press v.

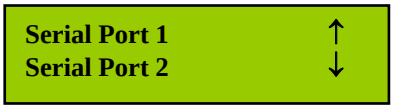
Press v.

Press v.

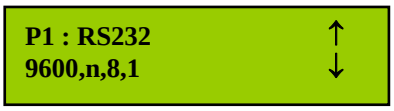
Press ^.

- **Serial Port (Port #1 for example)**

Press **SEL**.



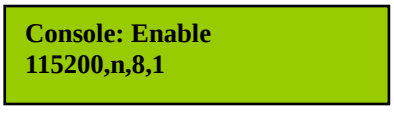
Press **SEL**.



Press v for port 2.

- **Console Port**

Press **SEL**

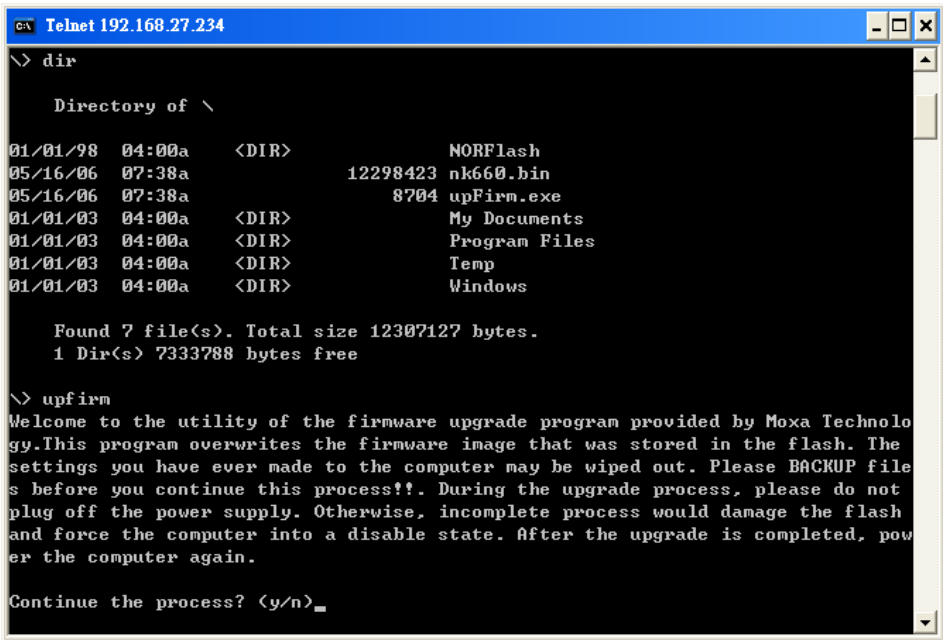


B

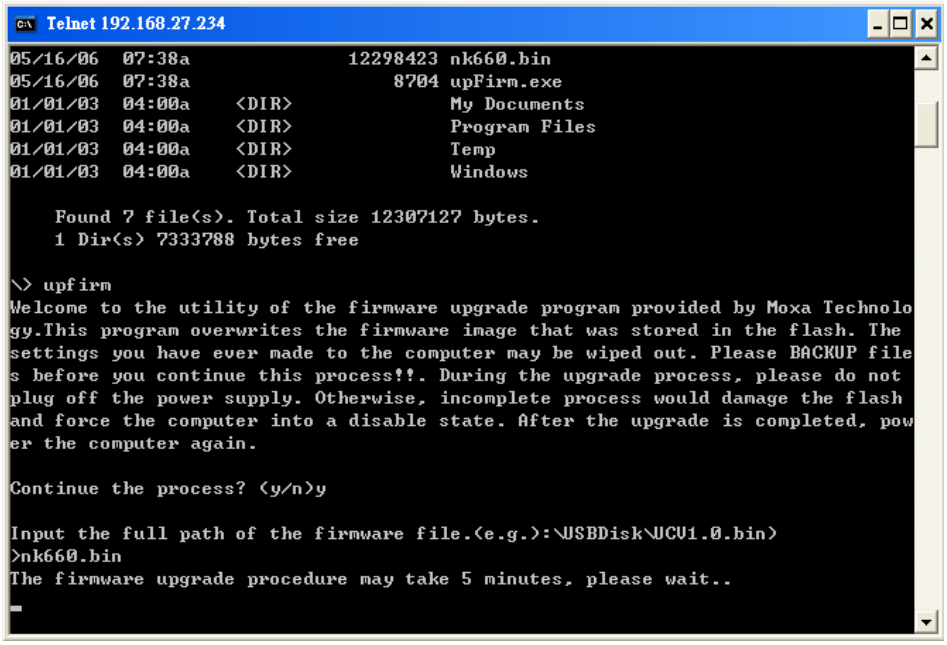
Firmware Upgrade Procedure

MOXA's engineering division continuously develops software features to improve the quality and functionality of MOXA's embedded products. The latest firmware is posted on the MOXA download center. To replace your product's firmware, perform the following steps:

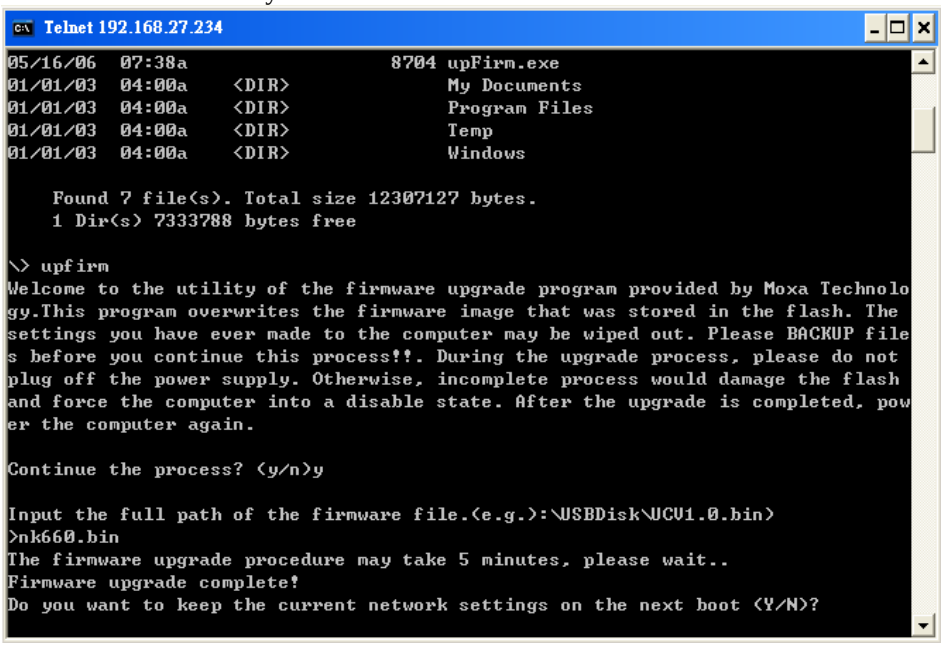
1. Navigate to the MOXA download center to download the program utility ***upfirm*** and the firmware file (e.g., da661/662/663.bin) that will replace the current one.
2. Upload both files to the target machine under the root directory (i.e., \).
3. Logon the target computer via a telnet or console connection.
4. Execute the ***upfirm*** utility. Press **y** to continue.


Telnet 192.168.27.234
\> dir
Directory of \
01/01/98 04:00a <DIR> NORFlash
05/16/06 07:38a 12298423 nk660.bin
05/16/06 07:38a 8704 upFirm.exe
01/01/03 04:00a <DIR> My Documents
01/01/03 04:00a <DIR> Program Files
01/01/03 04:00a <DIR> Temp
01/01/03 04:00a <DIR> Windows
Found 7 file(s). Total size 12307127 bytes.
1 Dir(s) 7333788 bytes free
\> upfirm
Welcome to the utility of the firmware upgrade program provided by Moxa Technology.This program overwrites the firmware image that was stored in the flash. The settings you have ever made to the computer may be wiped out. Please BACKUP files before you continue this process!!. During the upgrade process, please do not plug off the power supply. Otherwise, incomplete process would damage the flash and force the computer into a disable state. After the upgrade is completed, power the computer again.
Continue the process? (y/n)

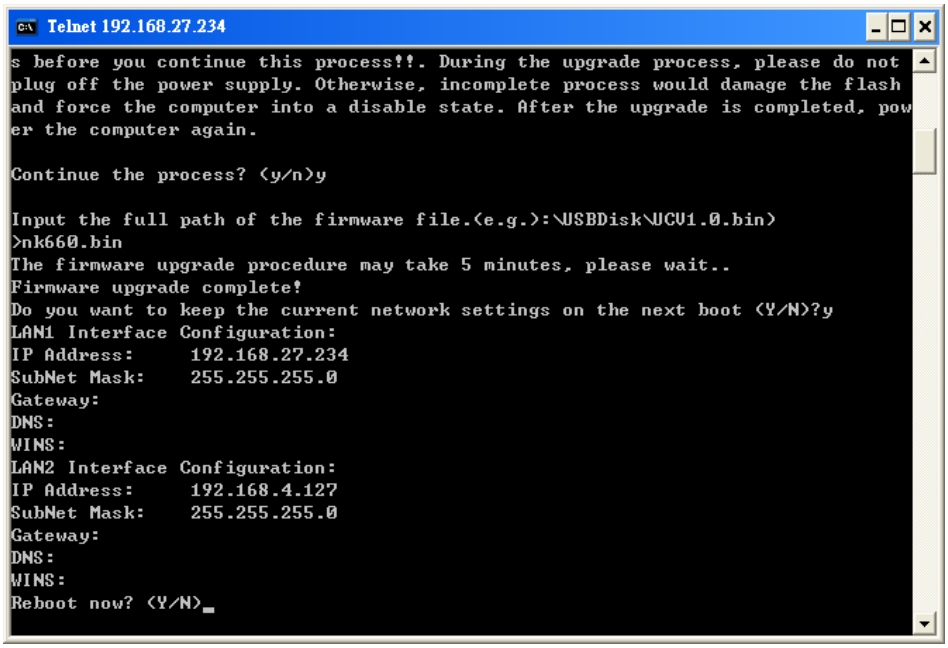
5. Input the full path of the firmware file and press Enter. The upgrade process takes about 5 minutes. The system should not be interrupted during this process.


Telnet 192.168.27.234
05/16/06 07:38a 12298423 nk660.bin
05/16/06 07:38a 8704 upFirm.exe
01/01/03 04:00a <DIR> My Documents
01/01/03 04:00a <DIR> Program Files
01/01/03 04:00a <DIR> Temp
01/01/03 04:00a <DIR> Windows
Found 7 file(s). Total size 12307127 bytes.
1 Dir(s) 7333788 bytes free
\> upfirm
Welcome to the utility of the firmware upgrade program provided by Moxa Technology.This program overwrites the firmware image that was stored in the flash. The settings you have ever made to the computer may be wiped out. Please BACKUP files before you continue this process!!. During the upgrade process, please do not plug off the power supply. Otherwise, incomplete process would damage the flash and force the computer into a disable state. After the upgrade is completed, power the computer again.
Continue the process? (y/n)y
Input the full path of the firmware file.(e.g.):\USBDisk\UCV1.0.bin)
>nk660.bin
The firmware upgrade procedure may take 5 minutes, please wait..

6. After the process is completed, enter "Y" to restore the current network settings or enter "N" to roll back to the factory default values.


Telnet 192.168.27.234
05/16/06 07:38a 8704 upFirm.exe
01/01/03 04:00a <DIR> My Documents
01/01/03 04:00a <DIR> Program Files
01/01/03 04:00a <DIR> Temp
01/01/03 04:00a <DIR> Windows
Found 7 file(s). Total size 12307127 bytes.
1 Dir(s) 7333788 bytes free
\> upfirm
Welcome to the utility of the firmware upgrade program provided by Moxa Technology.This program overwrites the firmware image that was stored in the flash. The settings you have ever made to the computer may be wiped out. Please BACKUP files before you continue this process!!. During the upgrade process, please do not plug off the power supply. Otherwise, incomplete process would damage the flash and force the computer into a disable state. After the upgrade is completed, power the computer again.
Continue the process? (y/n)y
Input the full path of the firmware file.(e.g.):\USBDisk\UCV1.0.bin)
>nk660.bin
The firmware upgrade procedure may take 5 minutes, please wait..
Firmware upgrade complete!
Do you want to keep the current network settings on the next boot (Y/N)?

7. Enter "Y" to reboot the target computer.


Telnet 192.168.27.234
s before you continue this process!!. During the upgrade process, please do not plug off the power supply. Otherwise, incomplete process would damage the flash and force the computer into a disable state. After the upgrade is completed, power the computer again.
Continue the process? (y/n)y
Input the full path of the firmware file.(e.g.):\USBDisk\UCV1.0.bin)
>nk660.bin
The firmware upgrade procedure may take 5 minutes, please wait..
Firmware upgrade complete!
Do you want to keep the current network settings on the next boot (Y/N)?y
LAN1 Interface Configuration:
IP Address: 192.168.27.234
SubNet Mask: 255.255.255.0
Gateway:
DNS:
WINS:
LAN2 Interface Configuration:
IP Address: 192.168.4.127
SubNet Mask: 255.255.255.0
Gateway:
DNS:
WINS:
Reboot now? (Y/N)

C

Service Information

This appendix shows you how to contact MOXA for information about this and other products, and how to report problems.

The following topics are covered in this appendix.

- **MOXA Internet Services**
- **Problem Report Form**
- **Product Return Procedure**

MOXA Internet Services

Customer satisfaction is our primary concern. To ensure that customers receive the full benefit of our products, MOXA Internet Services has been set up to provide technical support, driver updates, product information, and user's manual updates.

The following services are provided

E-mail for technical support ..... **ventas@siesamx.com**

Website for product information: ..... **www.siesamx.com**

Problem Report Form

MOXA DA-661/662/663 Series

Customer name:	
Company:	
Tel:	**Fax:**
Email:	**Date:**

1. **MOXA Product:** ☐ DA-661 ☐ DA-662 ☐ DA-663
2. **Serial Number:** _____

Problem Description: Please describe the symptoms of the problem as clearly as possible, including any error messages you see. A clearly written description of the problem will allow us to reproduce the symptoms, and expedite the repair of your product.

Product Return Procedure

For product repair, exchange, or refund, the customer must:

- Provide evidence of original purchase.
- Obtain a Product Return Agreement (PRA) from the sales representative or dealer.
- Fill out the Problem Report Form (PRF). Include as much detail as possible for a shorter product repair time.
- Carefully pack the product in an anti-static package, and send it, pre-paid, to the dealer. The PRA should be visible on the outside of the package, and include a description of the problem, along with the return address and telephone number of a technical contact.

Soporte en Ingeniería y Equipos, S.A de C.V

¡SOLUCIONES!

Para el ahorro y control de la energía eléctrica

Calidad de la Energía Eléctrica
y Monitoreo de Parámetros Eléctricos
Bancos de capacitores.
Filtros de Armónicas.
Estudios de calidad de Energía.
Medidores de parametros eléctricos.
Protección para corrientes Transitorias.

AGUASCALIENTES (MATRIZ)

Priv. Cerro de la bufa No. 105
Fracc. Lomas del Campestre
Aguascalientes, Ags. C.P. 20129

Tel: (449) 145 6701
Fax:(449) 145 6703

GUADALAJARA

Siempre Viva No. 113
Col. Vista Hermosa
Tlaquepaque, Jal. C.P.
45615

Tel: (334) 624 2951

Toda la Republica

01 800 0877 783

ventas@siesamx.com